N. A. C. A. BULLETIN

Vol. XI, No. 15 April 1, 1930

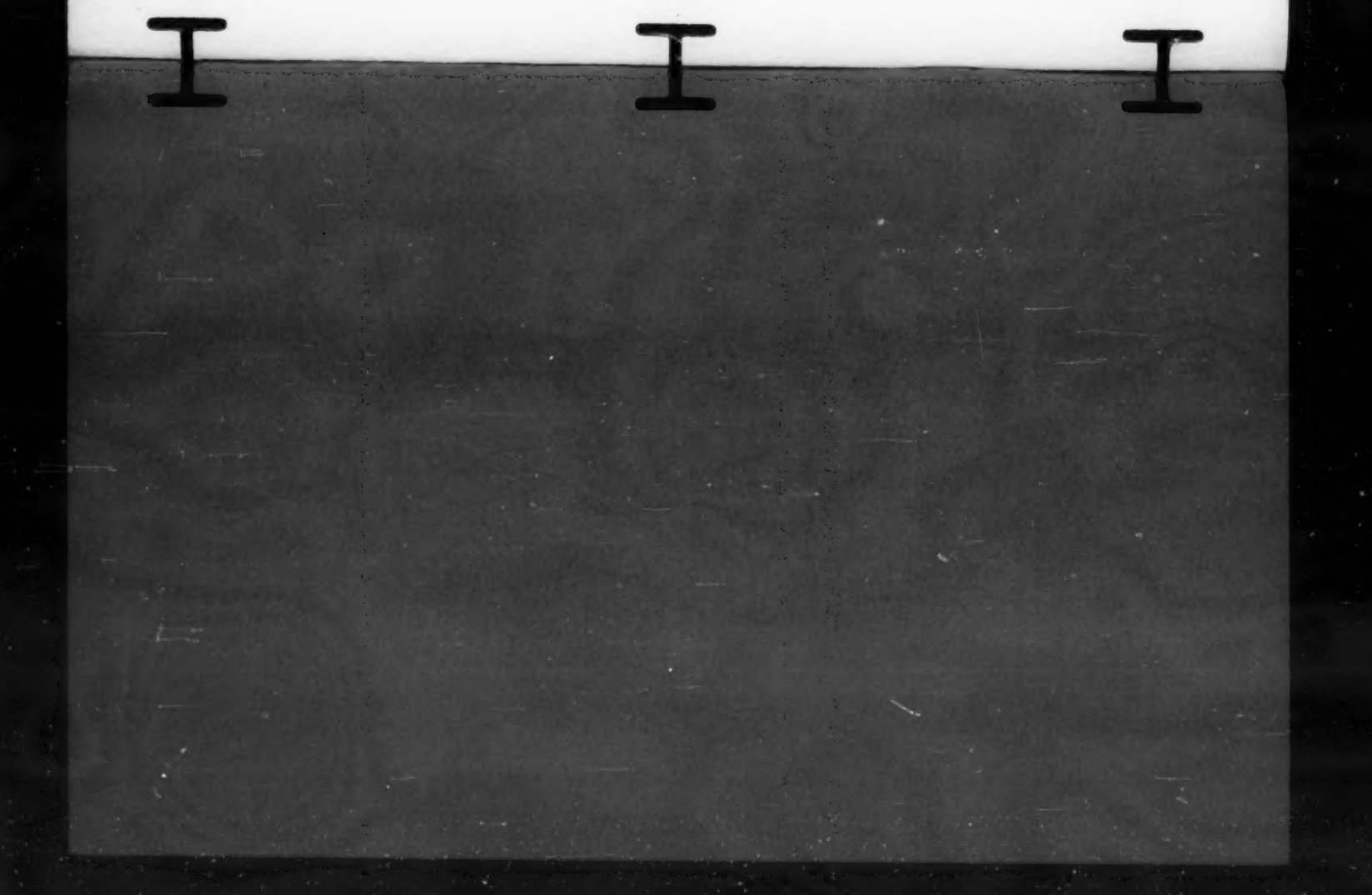
IN TWO SECTIONS

N.A.C.A. LIBRARY

Section I

The Basis for Wage Incentive Plans

This bulletin is published semi-monthly by the National Association of Cost Accountants, 1790 Broadway, New York, Subscription price $15.00 per year. Entered at the Post Office, New York, N. Y., as second class matter August 28, 1925, under the Act of March 3, 1879.



N. A. C. A. BULLETIN

Vol. XI, No. 15 **April 1, 1930**

The Basis for Wage Incentive Plans

By

G. J. STEGEMERTEN,
Westinghouse Electric & Mfg. Co.,
Pittsburgh, Pa.

The National Association of Cost Accountants does not stand sponsor for views expressed by the writers of articles issued as Publications. The object of the Official Publications of the Association is to place before the members ideas which it is hoped may prove interesting and suggestive. The articles will cover a wide range of subjects and present many different viewpoints. It is not intended that they shall reflect the particular ideas of any individual or group. Constructive comments on any of the Publications will be welcome.

Additional copies of this Publication may be obtained from the office of the secretary. The price to members is twenty-five cents per copy and to non-members seventy-five cents per copy.

EDITORIAL DEPARTMENT NOTE

With increased size in our producing and distributing units throughout all branches of industry, it has been found necessary to develop some means of bringing about the spirit of individual enterprise which, in a small organization, is one of the main reasons for profit. With ownership widely separated from operation it has been found necessary to develop some plan which would bring home to employees in all branches of industry the need for their efficient operation in order that a profit goal for the business as a whole and for themselves could be realized. Our Tenth International Cost Conference emphasized in the minds of our members the need for a serious study of wider application of incentive plans in business. Many of our members there for the first time caught the necessary vision to bring about a healthy inquisitiveness as to the whys and wherefors of these plans.

Our paper this time is the first of a series of three publications which will deal exclusively with incentive plans. This paper shows briefly how one of the large organizations gets its basic data through time studies. This paper will be followed by two other papers which will take up the application of incentive plans in several branches of a business.

Mr. J. G. Stegemerten, the author of this paper, was graduated from High School at Washington, D. C., in 1909. Soon after his graduation he went with the Westinghouse Electric & Mfg. Co. at East Pittsburgh, Pa., where he obtained wide practical experience in general machining, fitting and assembly work. At the same time he took a general engineering course in a night school and in 1917 entered the aviation service of the U. S. Army where he served as a mechanic.

At the close of the war he entered the Time Study Department of the Westinghouse Electric & Mfg. Co. where after three years' training on time study work, he was promoted to the position of Time Study Supervisor. He served in this capacity in various departments of the organization and was very active in installing the Standard Time System. In September, 1926, he was appointed Superintendent of Time Study in which position he has charge of all time study activities at the East Pittsburgh plant.

Mr. Stegemerten is the author of several papers on Wage Incentives and related subjects, notably among which was the paper on Job Standardization prepared for the Fourth International Management Congress held at Paris, June, 1929. He is also co-author with S. L. Lowry and H. B. Maynard on the book "Time and Motion Study for Wage Incentives."

This paper was delivered before the Pittsburgh Chapter.

COPYRIGHTED BY
NATIONAL ASSOCIATION OF
COST ACCOUNTANTS

APRIL 1, 1930

THE BASIS FOR WAGE INCENTIVE PLANS

NO ATTEMPT is made to offer apologies for the existence of wage incentive plans, as it is taken for granted the reader of this article is a believer in them. Rather an endeavor will be made to explain more especially the underlying principles of the system and methods as used by our company in order that it may be seen at a glance just how our Standard Time plan functions, it would be well to show first a comparison of the manner in which the principal incentive plans differ.

Figure 1 shows a comparison of the better known wage payment plans. At the upper left hand corner, the formulae for calculating earnings under each plan are given. The curves illustrate the actual application and are based upon a percentage of the day work rate.

It is known that crude forms of incentive plans existed centuries ago. For our purpose here, however, any comparisons made will refer to the incentive plans as applying to industry in, say, the last seventy-five years. In the early days little thought was given the unit of measurement, or rather, the basis for determining earnings. The foreman, who usually determined the allowance, resorted mostly to guess methods, using himself as the measuring stick and comparing all performance to what he felt he could do. Frequently, however, jobs were timed but the timing was more of an overall check and was done with the ordinary pocket watch. When a certain number of values were set, other jobs were compared to them. Liberal allowances brought about little embarrassment as ruthless cutting was resorted to, this being supposedly a good means of control.

It is understood that this was the method of determining allowances—which were usually in terms of so much money per unit—until Dr. F. W. Taylor, who is regarded as the "founder of Scientific Management", formulated the basic principles upon which, in a sense, modern industry now rests. It came somewhat in the nature of a discovery with Dr. Taylor, resulting from analyses and investigations conducted for the purpose of obtaining material for the "Art of Cutting Metals". In these studies, the performance of various kinds of metal were recorded as to speeds, feeds, life of the tool, etc. Dr. Taylor recognized that many things presented

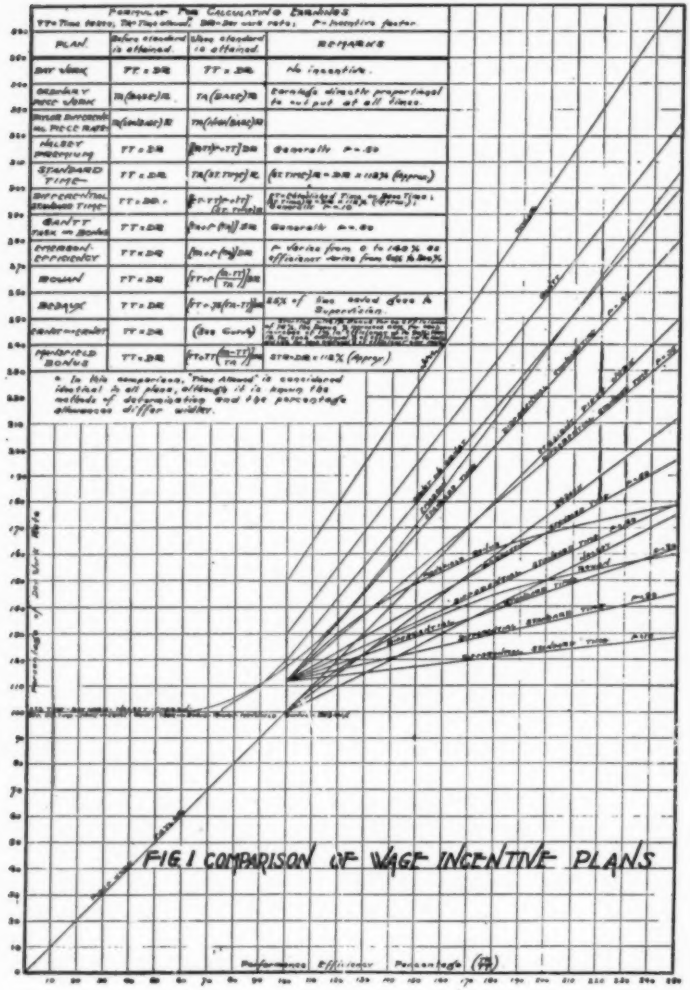


FIG. 1 COMPARISON OF WAGE INCENTIVE PLANS
Performance Efficiency Percentage (Eff)
Percentage of Time Value Earned

themselves by breaking up a job or operation into its elements, and hence it might be said the basis for scientific management—the segregation of elements—was in reality a discovery.

Many different methods of making studies are at present employed but all resort to breaking up the job into its details or elementary operations and then arranging these elements in proper sequence. This procedure is referred to as the making of the motion study and the elementary operations arranged in proper sequence are the actual motion study.

There are two methods of making the motion study. One has to do with observing the operator at work and making a complete record of all elements performed together with the attendant conditions. The other method employs a motion picture camera which makes a photographic record of the course of small electric light bulbs attached to different parts of the operator's body while he is performing a given operation. By studying these films the number of elements is supposedly reduced to a minimum and the one best method determined. All operators concerned are then taught this method and by so doing the sponsors of this system feel they have eliminated the element of skill. Having made the motion study and recorded the elemental watch readings for a number of cycles—this number depending upon the nature of the piece studied and the length of the cycle—the summary is then made.

Many different methods of obtaining the most representative value for each elementary operation exist, the most common among which are:

1. Straight averaging.
2. Arranging successive times according to magnitude and using a percentage selection.
3. Variation—adjusting the average by the amount of the deviation from average.
4. Leveling.

The leveling method is probably the latest development along this line and is considered the best method by many authorities. This may sound somewhat egotistical in that the method originated with and is now employed by our Company.

An explanation with the use of a sample time study sheet will serve to illustrate this method and at the same time will make clear

some of the adjuncts of a time study which have already been referred to.

Figure 2. Front of Time Study Sheet

The face or front of our time study sheet is shown in Figure 2. The elemental operations are listed in the oblique lines at the top of the sheet and watch readings are recorded in the columns headed "R". By subtracting between watch readings, the elemental elapsed times, "T", are determined.

Subnormal and abnormal values are encircled and disregarded in the "Summary" at the bottom of the sheet. The method used in handling "Foreign Elements" at the termination of a regular element, or in the middle of a regular element, is clearly shown. The letter "M" appearing in several of the "R" columns signifies that the time study "missed" these readings.

At the lower right hand corner of the sheet, space is provided for grading the performance shown on the study. The observer indicates according to his best judgment his opinion of the operator's Skill, Effort, and Conditions. The grading of Consistency depends upon the lines minimum "T" and Maximum "T" which give the lowest and highest occurrences for the different elements. This variation determines the grading to be given Consistency, which grading incidentally is a matter of judgment.

In the example, numerical values are inserted opposite each comparative term of Skill, Effort and Consistency merely for the purpose of illustration. As a matter of fact these values do not appear on the time study sheet while the study is being made, the reason being that it is thought preferable to have the observer grade these characteristics by comparative terms such as Good, Excellent, Fair, Poor, etc.

As will be seen in the example, after subnormal and abnormal values have been eliminated, each column is added and divided by the number of observations, giving the average "T". In keeping with the principle of leveling, this average must be adjusted according to the grading given the performance. This is determined by adding algebraically to unity numerical values corresponding to the gradings given the performance. In the example given, the leveling factor is 1.15. The rest of the calculation is self-explanatory, the percentage allowance being made to cover unavoidable de-

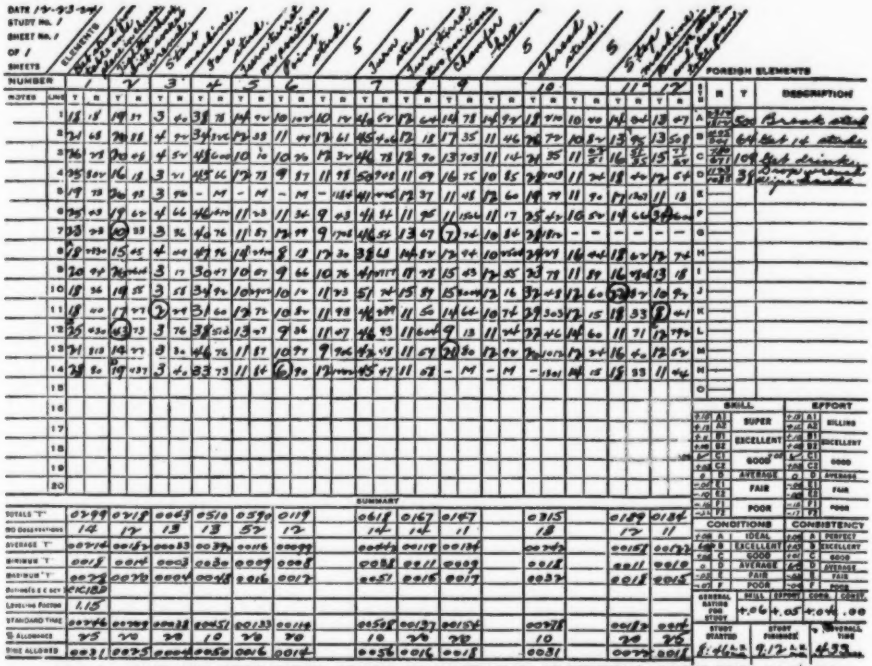


Fig. 2 - MODEL TIME STUDY SHOWING SUMMARY AND COMPUTATIONS OF ELEMENTAL ALLOWED TIMES COMPLETED

lays, normal interruptions, personal needs, etc., and depending upon whether the elementary operation is part handling, machine handling, or machine feed.

Figure 3. Back of Time Study Sheet.

All identification of the job studied appears on the reverse side of the time study sheet as will be noted in Figure 3. Where sketches have a tendency to clarify the situation they should be included. The determination of the total standard time allowances is also taken care of on this side of the sheet. It is essential that all conditions which existed at the time the time study was made, appear here for future reference.

In arriving at the figures used in the Performance Rating Table, many studies were made on different workers and under different conditions throughout the East Pittsburgh Works and the results compared. In this manner a common understanding of the different degrees of skill and effort were obtained and appropriate numerical values chosen.

In a similar manner, many studies were made over long periods of time to determine the amount of time required to take care of personal needs, normal interruptions, etc.

Using the Time Study

In standard-product plants where the operator does the same thing over and over, for example, the automobile industry, garment factories, the manufacturing of kodaks, etc., it is readily seen that there is no use for the time study after the time allowances have been established. On the other hand, in plants where the product varies daily, it is necessary to make a more extensive use of time studies.

In our plant, 160 time study men set 100,000 time allowances monthly. To accomplish this by indivdual time study would require many times the number of our present time study force which of course would be almost prohibitive. The fact is, we set 80% of our allowances by means of formulae. The formula contains in most cases an algebraic expression which, through substitution, gives the desired time allowance.

Representative time studies of a given activity are arranged on a so-called "Master Table of Detail Time Studies".

STUDY No. 1 DATE 12-23-24. **OBSERVATION SHEET—W. E. & M. CO.**

OPERATION Face, Point, Turn and Thread Start End of Stud.

DEPARTMENT 3-1 | OPERATOR Man NAME Domer No. 709

EQUIPMENT #5 Warner and Swasey Turret Lathe

MACHINE TOOL No. 4689

SPECIAL TOOLS, JIGS, FIXTURES, ETC.

CONDITIONS Good. Machine had been recently repaired.

OBSERVED A.B.Doe. APPROVED BY John Doe.

MOULD Forge DIE # 55433 DWG. X85797 SUB. 5

PATTERN INS. SPEC. STYLE 284894 ITEM 7

PART DESCRIPTION Stud for Type-219-A Control Box MATERIAL Screw stock,

SKETCH

No.	ELEMENTARY OPERATIONS	SMALL TOOL NOS. FEED SPEED, DEPTH OF CUT, ETC	MACHINE TIME ALLOWED (MAYBE LESS OTHER WISE)	OPERATOR'S TIME ALLOWED PER PIECE OR CYCLE	TOTAL TIME ALLOWED
1	Get and place stud in chuck				.0081
2	Tighten chuck				.0022
3	Start machine				.0004
4	Face stud	Forged tool			.0050
5	Turn turret-one position		.0016	4	.0064
6	Point stud	Box tool			.0014
7	Turn stud	Box tool			.0050
8	Turn turret-two positions				.0016
9	Chamfer hex	Forged tool			.0018
10	Thread stud	Die			.0081
11	Stop machine				.0004
12	Remove stud				.0018

TIME ALLOWED, SET UP EACH PIECE TOTAL .0849 hrs

REMARKS:

Due to turret construction, it takes no longer to turn turret two positions than it does to turn it one position.

Fig. 3 - MODEL TIME STUDY SHOWING BACK OF SHEET COMPLETELY FILLED OUT

Figure 4. Master Table of Detail Time Studies.

Figure 4 shows a portion of a sample Master Table of Detail Time Studies from which all values for formulae are taken, the sheet accommodating the results of twenty time studies. All elementary operations found on all studies taken on a given class of work are listed under "Operation Descripton" and the values from these studies are listed opposite these descriptions in the proper columns, thus giving at a glance a ready comparison or summary of all data collected on the different jobs.

The time study man, with a thorough understanding of how each value was determined, is able to select the most representative value for each constant element and uses the values appearing for variables in making curves and charts.

When values have been determined for the various elements and the formula expression decided upon, the formula report is made according to the outline shown in Figure 5.

Figure 5. Outline of Formula Report.

Figure 5 gives the outline which is followed in writing up a formula report. Under "Part" will be found the name or type of apparatus to which the formula applies; the "Operation" gives a complete description of all operations performed on this type of apparatus; the "Application" gives the limits between which the time values apply as well as governing conditions; "Work Station" indicates the location at which the study was made, for example, "bench", "floor", etc.; the "Allowed Time" indicates the method of arriving at, or the expression for computing, the ultimate time values (this may be obtained by selecting time allowances for operations which were listed in a motion study, or, from curves or algebraic expressions); the "Analysis" gives a complete story of all conditions incident to the proper carrying out of the operation; the "Procedure" as the name indicates, shows the logical sequence of elementary operations; under the heading of "Time Studies" will be found a list of all studies used in making the formula; "Table of Detail Operations" includes all elementary operations performed in the studies of all jobs; the "Synthesis" as the name indicates is the building-up process or explanation of the manner in which curves or algebraic expressions or combinations of opera-

SHEET NO.—
OF—SHEETS

MASTER TABLE OF DETAIL TIME STUDIES

FORMULA F-13 #7
DATE May 1st 1926
PART Enclosing Cabinets
OPERATION (Layout Panel for drilling / Assemble Panel to Box
PERFORMED ON Bench
COMPILED BY J. A. Smith

JOB CHARACTERISTICS

	STUDY	B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8	B-9	B-10	B-11	B-12	B-13
	OPERATOR	Hiler	Hiler	Hiler	Gallhare	Gallhare	Hiler	Hiler	Hiler	Miller and Hiller	Hiller	Hiller	Miller and Hiller	
SKILL	EFFORT	Good / Excellent	Good / Excellent	Good / Excellent	Good	Ave	Ave	Good	Good	Good	Good	Good	Good	
	Assemble	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	
	Layout							Good	Excellent	Good	Good	Good	Excellent	
	Panel area	50	168	108	778	280	127.5	296	296	575	910	127.5	1830	
	Drawing No	6-0449	30766	433379	423517	41302	371822	371902	371902	46342	60278	371823	617930	
	How mounted	Mtg Stud	Mtg Bkt	Mtg stud	Cline	Mtg stud	Mtg Bkt	Mtg Bkts					Mtg Bkts	

SYMBOL	OPERATION DESCRIPTION	TIME ALLOWED (HOURS)	REFERENCE													
A	Put in one mounting stud complete	Eg 1		V	0150		0185		0198							
B	Put on one name plate complete	Eg 2-3		C	0316	0478	0387		0419							1048
C	Prepare electric hand drill	0121	S-1	M	0121	0147	0197		0166							0148
D	Place one rubber washer on stud	0026	S-3	V	0040		0086									
E	Place panel in box	Eg 7		C	0120	0181	0195	0086	0060	0061	0072		0014	0148	0095	0043
F	Bolt panel to mtg stud (gerstud)	0080	Comp EA	C	0110		0068		0065							
G	Put on one cover lock	0550	Comp EA	C	0619		0584									
H	Remove box	0049	S-7	C			0094		0046	0061	0049	0084	0035	0105	0042	
I	Chalk areas or mark holes for filing	0116	S-11	C		0129						0065	0099	0204	0116	
J	Put in one bolt with wrench	0108	S-Eg 4	C		0108		0108								0110
K	Remove panel from box	Eg 5		C		0025		0049			0044				0056	
L	Get box	0023	S-3	C			0075	0062	0059	0091	0045	0121	0071	0222	0116	
M	Get from or remove panel to stock	Eg 9		C			0081		0128	0110	0173	0056	0078	0107		0122
N	Cut off 1 brass bolt on back of panel	0015	S-9	C			0045		0017							
O	Layout all name plate holes for drill	Eg 14		C											0355	
P	Fit panel into position	Eg 10		C				0166	0070	0031	0084		0134			0138
Q	Set box on floor	0100	S-6	C					0094	0100	0083			0084		
R	Tie or untie cord	0036	Comp EA	C										0058		
S	Cut hole - file and fit cover plate	2907	S-7	M							2907					
T	Layout + saw 1 mtg support	1249	S-7	M							1249					
U	Layout side hole - Center punch - bore	1360	S-8	M								1360				
V	Layout one hole for drilling	0028	S-10	C								0013	0030	0028	0026	
W	Center punch one hole	0039	S-10	C								0015		0039	0041	
X	Chalk mark around one punch point	0008	S-11	C								0010			0008	
Y	Layout + mark 1 hole in side door	0290	S-11	C											0298	
Z	Put in switch handle complete	0827	S-6	C					0827							
A1	Put on one name plate	Eg 3+6		C					0152	0232						
B1	File ream one hole in panel	0144	S-4	M				0144								

MASTER TABLE COMPILED FOR PANEL MOUNTING FORMULA-

FIG. 6

tions are made; under "Inspection" will appear, in the most specific terms, requirements made by the Inspection Department, for example, tolerance, finish, etc.; and "Payment" shows the particular type of wage payment plan used.

The routine time study man who is to apply the formula will have little occasion to refer to all of these subdivisions after he has familiarized himself with the contents.

To expedite the establishing of time allowances, therefore, those parts of the formula, which must be consulted each time a value is set, are placed on what is known as a "Working Sheet" and this sheet is inserted in the formula book of the section involved.

Figure 6. Formula Working Sheet.

The formula working sheet is in reality a condensed formula, in other words, that part of the formula which is required to enable a time study man to set an allowance, is taken from the formula and put in most convenient form. The man using the formula working sheet will first have a full understanding of the way in which values were derived and will understand how values are built up in the synthesis, but it is not necessary that such information appear on the working sheet. The formula books used by routine time study men are filled with working sheets of this nature, thereby expediting the setting of time allowances.

Formula Number

Date

Part:
Operation:
Application:
Work Station:
Allowed Time:
Analysis:
Procedure:
Time Studies:
Table of Detail Operations:
Synthesis:
Inspection:
Payment:

Fig. 5—Outline of Formula Report

Possible Application of Incentives

A much debated question is: Where should incentive plans be applied? We feel that the applicaton of incentives is limited only by the possible results accomplished, that is, to say, there is scarcely an activity which cannot be measured but it is true that certain activities would not permit of profitable application. Where it is necessary that a man be in attendance on a certain piece of equipment day in and day out, whether or not much exertion is required, it would be unwise to place him on incentive. Such activities are: watchmen, elevator operators, and switchboard operators.

We have, however, many successful applications of an unusual nature among which are: maintenance work—window cleaning, painting, jaintor work, and maintenance wiring; transportation; tool work; die work; power house activity; storerooms; material handling. Many of these activities, formerly considered indirect labor, are now considered direct labor and written up as regular operations which are charged directly to the stock order. In the case of material handling, for example, the relation to the productive operations is determined and the operation written up regularly. In costing, as has already been suggested, this item is regarded as direct labor and included in the cost of the product rather than in the overhead as an expense item.

Group Plan

Although the results obtained from incentive systems have been remarkable, there are, at the same time, some disadvantages which occur from having a number of workers concentrating only on their own individual production. Each worker realizes that he is paid only for what he produces, and it is but natural that he should strive to increase his own output, regardless of all else. He feels that he has no time to help out new men or give a neighbor worker a hand when needed, and he is unwilling to lose time hunting lost material, doing a little extra work for which he is not directly paid but which will improve quality, speed up work as a whole or help out the supervisory force. In other words, individual effort is stimulated at the expense of cooperative team work. To correct such conditions, we use a Group System. That it has accomplished its purpose has been proven by successful application in many and varied lines of work within the company. A group is a number

Formula F-1, No. 26. November 15, 1925.

PART: Controller shafts.

OPERATION: Grind gear, handle, star wheel, and bearing fits.

MACHINE: Norton Grinder, Size 6″ × 32″ (2″ Stone) W. E. & M. Co. No. 23793.

STANDARD TIME:

First Piece Time

.163 + T + 3 (Each Additional Piece Time).

Additional Piece Time

.0175 X + .0016 Ls + .0135 Y + .0086 (Lt —1) + .0021.

Where Ls = Total length in inches of fits 1⅞″ or under.
Lt = Total length in inches of fits over 1⅞″.
T = Values from Table I.
X = No. of fits 1⅞″ or under.
Y = No. of fits over 1⅞″.

TABLE I.
True Stone

No. of fits per shaft	*Dec. Hours*
1	.1068
2	.1068
3	.1602
4	.2136
5	.2670

APPLICATION: This formula applies to rough and finish grinding of shafts up to and including six pounds where length of fit does not exceed eight inches, as done in Section F-1 with methods and equipment as at present.

INSPECTION: Inspected for size. Inspection requirements are:—

Handle, star wheel and gear fits { + 0005 / — 0000

Bearing Fits. { — 0010 / + 0000

PAYMENT: Standard Time Job Basis.

APPROVED: _____ _____
RATE FOREMAN RATE DEPARTMENT

Fig. 6—Formula Working Sheet

of workers doing usually the same class of work whose entire output is pooled and then distributed on the basis of hours worked.

Figure 7. Group Earnings Sheet (Distribution of Group Earnings).

This form is provided for the purpose of determining the pay of each group member and takes care of all possible variations in reporting time, such as instruction hours, inventory hours (work performed on incomplete jobs), and elpased standard time hours, and indicates the exact calculations made for each. It will be seen that apparently two different plans of standard time are used, namely, Differential Standard Time and Straight Standard Time. Differential Standard Time is used on all cases where output is not directly proportional to effort expended, for example, storeroom work. Under this plan the group receives that part of the time saved to which it is felt they are justly entitled, this being determined by the factor used. The rest of the form is more or less self explanatory.

For example, assume a five-man group and designate the individuals as A, B, C, D and E. Assume a two-week pay period in which time is 100 working hours and that during the period "A" worked full time or 100 hours, "B" did likewise, "C" worked 80 hours, "D" worked 75 hours and "E" worked 90 hours. The total hours worked by the group then are $100 + 100 + 80 + 75 + 90$ or 445.

If during this time the total allowed hours for the group's output are 600, the group efficiency has been $\frac{600}{445}$ or 134.81%.

The money earned by the various members is calculated as follows: assuming that A's rate is 54¢, B's rate, 45¢, C's rate, 40¢, D's rate, 45–, and E's rate, 54¢.

$$\begin{aligned}
\text{A's} &= 100 \times 134.81\% \times \$.60^{*} = \$80.89 \\
\text{B's} &= 100 \times 134.81\% \times .50 = 77.41 \\
\text{C's} &= 80 \times 134.81\% \times .40 = 43.14 \\
\text{D's} &= 75 \times 134.81\% \times .50 = 50.56 \\
\text{E's} &= 90 \times 134.81\% \times .60 = 72.85
\end{aligned}$$

*Since the group has "made out", or, performed the work within the allowed time, each member will be paid his share of the allowed time at a rate approximately 12% higher than his day work rate. This higher rate is termed the "Standard Time Rate".

GROUP-EARNINGS

(with inventory of excessive incomplete work)

Group No. 4 Section E-4 Pay Ending 12-31-29

Hours Worked In Group (Not including Student Instruction Time)	DAY-WORK	INVENTORY-HOURS This Pay	INVENTORY-HOURS Previous Pay	DIFFERENTIAL STD. TIME		STANDARD TIME	
A							
Regular Instruction Hours % B	Elapsed Hours	Gross Inst. Net		Elapsed Hours	Factor Applied Not Allowed Hours	Elapsed Hours	Allowed Hours
Net Group Hours C 445.00	D	E	F	G	H	445.00	K 600.00
Set-Up Hours	%	%	%		%	%	% 134.81

CHECK NO.	A NET HOURS WORKED	B INSTRUCTION HOURS	D DAY WORK HOURS	E INVENTORY HOURS THIS PAY	F INVENTORY HOURS PREV. PAY.	D&E INVENTORY AND DAY-WORK HOURS to be paid for	G or J ELAPSED STD. TIME HOURS	H or K ALLOWED STD. TIME HOURS	RATE L D.W.	RATE M STD. TIME	B&L INSTR. EARNINGS	G+B&L DAY, THIRD PAY AND DAY WORK EARNINGS	H or K or M or J STD. TIME EARNINGS	INCENTIVE BONUS EARNINGS	No. DEDUCT FOR DAY WORK PAYMENT IN PREV. PAY	NET REGULAR EARNINGS
A	100 00							134 81		54 60			80 89			
B	100 00							134 81		45 50			77 41			
C	80 00							107 85		36 40			43 14			
D	75 00							101 11		45 50			50 56			
E	90 00							121 45		54 60			72 85			
	445 00							600 00					344 85			

DAY-WORK | STD. TIME | A

A INCLUDES O. T. BONUS AND INSTRUCTION EARNINGS

Payroll Clerk John Doe.

Fig. 7

As was previously said, there is greater cooperation among men in a group than among individuals. Since everything that will aid in the completion of the work will mean more money for the group, and hence for each man, the individual is willing to help the other fellow whenever necessary. This willingness to cooperate with one another increases with the length of time the group has been working together, until a group spirit is built up which will affect every man in the group.

SUGGESTED BIBLIOGRAPHY

N. A. C. A. Bulletin Sec. I.
Vol. III, No. 13
Vol. VIII, No. 16
Vol. X, No. 16

N. A. C. A. Bulletin Sec. II.
Vol. IX, No. 7, pp.348-354

Yearbooks:
1928—pp. 41-93.

Other Publications:
Wage Incentive Methods—Lytle, published by Ronald Press Co., 15 E. 26th St., N. Y. C.
Time and Motion Study for Wage Incentives—G. J. Stegemerten, published by McGraw-Hill Book Co., 370 Seventh Ave., New York.

Vol. VIII

No. 21—Materials in Standard Costs, *William L. Churchill*
No. 22—Accounting for Capital Assets, *K. C. Richmond*
No. 24—"Do We Need Calendar Reform?" *By George Eastman*

Vol. IX

No. 1—Measures of Business Efficiency, *Clyde Morgan*
No. 2—The Profit Element, *James H. Rand, Jr.*
No. 5—An Adaptation of Mechanical Accounting Control, *R. G. Regner*
No. 6—Budgeting Control and Standard Costs in the Newsprint Paper Industry, *G. Andrew Ware*
No. 10—Forge Shop Production—Cost Accounting, *Frank S. Hatch*
No. 11—Co-ordinating the Factory and General Accounting to Insure Prompt Monthly Closing, *John E. Horn*
No. 12—The Analysis and Distribution of Sales Distributional Costs, *James H. Barrett*
No. 14—Waste and Its Elimination, *Paul E. Holden and William S. Ford*
No. 15.—Depreciation As Applied to Public Utilities, *W. B. S. Winans*
No. 17—Public Utility Economics, *Theodore J. Grayson*
No. 18—Unintentional Falsification of Accounts, *Ernest F. DuBrul*
No. 19—European Manufacturing Methods and Costs, *Chas. E. Bedaux*
No. 20—Tanning and Leather Products Costs, *F. E. Barth*
No. 23—Foundry Costs, *Albert E. Grover*
No. 24—Depreciation Accounting in the Machine Tool Industry, *Thomas B. Frank*

Vol. X

No. 3—"New Technique in Selling and Administrative Cost Accounting," *Albert A. Rose*
No. 4—Keys to Internal Control of Costs, *E. S. La Rose*
No. 8—Bank Credit and Budgetary Control, *Michael H. Cahill and John P. Putnam*
No. 9—A Cost System for Shop and Foundry, *W. G. Robinson*
No. 10—Allocation of Selling and Administrative Expenses to Units Sold, *C. A. Renard*
No. 12—Accounting for Fixed Capital Expenditures, *Melvin F. Wagner*
No. 14—Problems in Textile Costs and Management, *Clinton W. Bennett and Ralph W. Bumstead*
No. 15—Humanizing Cost Findings, *Charles Reitell*
No. 16—How Group Time Standards Reduce Costs, *J. H. Marks*
No. 17—Retail Accounting, *Charles Garties and A. E. Oxenreiter*
No. 18—Motor Bus and Shipping Accounting, *G. S. H. Caston and R. V. Winquist*
No. 19—The Relation of Cost Accounting to Industrial Research, *William S. Wheeler, Jr., and Earl P. Stevenson*
No. 21—Accounting From the Management Viewpoint, *Monard V. Hayes*
No. 22—Capital Facilities—Accounting Principles and Methods, *Frederic W. Kilduff*
No. 23—Costs in Airplane Construction and Transportation, *C. Roy Keys*
No. 24—A Survey on the Effect of Departmental Consolidation on Cost—Office and Factory, *Arthur Van Vlissingen, Jr.*

Vol. XI

No. 1—The Depreciation Element in Burden Estimates, *Professor John B. Canning.*
No. 2—Accounting for Dairy Products, *H. H. Neel*
No. 3—Cost Accounting for Distribution in Retail Grocery Stores, *Wroe Alderson*
No. 4—Fixed Property Records—Their Forms and Uses, *A. L. Prickett*
No. 5—A Manual of Budget Preparation and Budgeting as Applied to Auto-
No. 6—The Manufacturer's Marketing Cost, *E. Stewart Freeman*
No. 7—Manufacturing Expense Analysis, Classification, and Distribution, *William A. Ulrich*
No. 8—The Organization and Functioning of an Office, *D. S. Smith*
No. 9—Standard Costs in the Illuminating and Industrial Glass Industry, *G. A. Rothrauff*
No. 10—Rebuilding Antiquated Cost Systems and Punched Hole Accounting, *Henry R. Boston and Robert D. Pettit*
No. 11—Accounting for Fully Depreciated Assets, *J. C. Cassel*
No. 12—Budgeting and Forecasting in an Individual Company, *Joseph H. Barber*
No. 13—The Interpretation of Financial Statements for Purposes of Managerial Control, *George Rea.*
No. 14—Accounting for Waste in Industry, *Edward Early*
No. 15—The Basis for Wage Incentive Plans, *G. J. Stegemerten*

Copies of the above publications which are not out of print may be obtained from the office of the secretary of the Association, 1790 Broadway, New York City, at the price of 75 cents per copy.